

# C# Unit Tests

## Table of Contents

1. Introduction.....	1
2. Frameworks.....	1
2.1. xUnit.....	1
2.2. NUnit.....	1
2.3. MS Test.....	1
3. Unit tests - How to.....	2
3.1. NUnit.....	2
3.1.1. Set Up Test for .net (core) framework.....	2

[Home](#)

## 1. Introduction

It's about the main unit test framework used for C#

[Testing on Microsoft Site](#)

## 2. Frameworks

### 2.1. xUnit

xUnit is a free, open-source, community-focused unit testing tool for .NET. The original inventor of NUnit v2 wrote xUnit.net. xUnit.net is the latest technology for unit testing .NET apps. It also works with ReSharper, CodeRush, TestDriven.NET, and Xamarin. xUnit.net is a project of the .NET Foundation and operates under its code of conduct.

### 2.2. NUnit

NUnit is a unit-testing framework for all .NET languages. Initially, NUnit was ported from JUnit, and the current production release has been rewritten with many new features and support for a wide range of .NET platforms. It's a project of the .NET Foundation.

### 2.3. MS Test

MSTest is the Microsoft test framework for all .NET languages. It's extensible and works with both .NET CLI and Visual Studio

## 3. Unit tests - How to

### 3.1. NUnit

[Unit Testing with NUnit on Microsoft Site](#)

[NUnit Documentation](#)

Visual Studio Test Adapter

The NUnit 3 Test Adapter allows you to run NUnit 3 tests inside Visual Studio or with dotnet on the command line.

#### 3.1.1. Set Up Test for .net (core) framework

¥ Create a test library.

¥ NUnit framework

```
install -Package NUnit -Version 3.13.3
```

```
Ê      Install from package manager console (visual studio)
Ê      PM> Install -Package NUnit -Version 3.13.3
Ê      Restoring packages for D:\ccp_wrks\Poc\10-
PocNetFrameworkHelperLibrary\src\PocHelperLibrary\PocHelperLibraryTest\PocHelperLibraryTest.csproj...
Ê      GET https://api.nuget.org/v3-flatcontainer/nunit/index.json
Ê      OK https://api.nuget.org/v3-flatcontainer/nunit/index.json 122ms
Ê      GET https://api.nuget.org/v3-flatcontainer/nunit/3.13.3/nunit.3.13.3.nupkg
Ê      OK https://api.nuget.org/v3-flatcontainer/nunit/3.13.3/nunit.3.13.3.nupkg 8ms
Ê      Installed Microsoft.NETCore.Platforms 1.1.0 from C:\Program Files
(x86)\Microsoft SDKs\NuGetPackages\ with content hash
kz0PEW2l hqygehl /d6XsPCQzD7ff7gUJaVGPVETX611eadGsA3A877GdSI UOLRVMCTH/+P3o2i DTak+S08V2+A
==.
Ê      Installed NUnit 3.13.3 from https://api.nuget.org/v3/index.json with content
hash
KNPDpls6EfHwC3+nnA67fh5wpXeLb3VLFAFLxrug6JMYDLHH6lnaQIWR7Sc3y75d/9IKzMksH/gi08W7XWbmnQ
==.
Ê      Installed NETStandard.Library 2.0.0 from C:\Program Files (x86)\Microsoft
SDKs\NuGetPackages\ with content hash
7jnbRU+L08FXKMxqUfl xEXtVymWvNOrS8yHgu9s6EM8Anr6T/wlX4nZ08j /u3Asz+tCufp3YVwFSEvFTPymBPA
==.
Ê      Installing NuGet package NUnit 3.13.3.
Ê      Generating MSBuild file D:\ccp_wrks\Poc\10-
PocNetFrameworkHelperLibrary\src\PocHelperLibrary\PocHelperLibraryTest\obj\PocHelperLi
braryTest.csproj.nuget.g.props.
Ê      Generating MSBuild file D:\ccp_wrks\Poc\10-
PocNetFrameworkHelperLibrary\src\PocHelperLibrary\PocHelperLibraryTest\obj\PocHelperLi
```

```

braryTest.csproj.nuget.g.targets.
Ê      Writing assets file to disk. Path: D:\ccp_wrks\Poc\10-
PocNetFrameworkHelperLibrary\src\PocHelperLibrary\PocHelperLibraryTest\obj\project.ass
ets.json
Ê      Restored D:\ccp_wrks\Poc\10-
PocNetFrameworkHelperLibrary\src\PocHelperLibrary\PocHelperLibraryTest\PocHelperLibrar
yTest.csproj (in 3.9 sec).
Ê      Successfully installed 'Microsoft.NETCore.Platforms 1.1.0' to
PocHelperLibraryTest
Ê      Successfully installed 'NETStandard.Library 2.0.0' to PocHelperLibraryTest
Ê      Successfully installed 'NUnit 3.13.3' to PocHelperLibraryTest
Ê      Executing nuget actions took 297 ms
Ê      Time Elapsed: 00:00:04.5083532

```

## ¥ NUnit Test Adapter

```
Install -Package NUnit3TestAdapter -Version 4.3.1
```

```

Ê      PM> Install -Package NUnit3TestAdapter -Version 4.3.1
Ê      Restoring packages for D:\ccp_wrks\Poc\10-
PocNetFrameworkHelperLibrary\src\PocHelperLibrary\PocHelperLibraryTest\PocHelperLibrar
yTest.csproj...
Ê      GET https://api.nuget.org/v3-flatcontainer/nunit3testadapter/index.json
Ê      OK https://api.nuget.org/v3-flatcontainer/nunit3testadapter/index.json 157ms
Ê      GET https://api.nuget.org/v3-
flatcontainer/nunit3testadapter/4.3.1/nunit3testadapter.4.3.1.nupkg
Ê      OK https://api.nuget.org/v3-
flatcontainer/nunit3testadapter/4.3.1/nunit3testadapter.4.3.1.nupkg 9ms
Ê      Installed NUnit3TestAdapter 4.3.1 from https://api.nuget.org/v3/index.json
with content hash
R+bGFtsUpLWywJ T1nb3xMmoVa2AIw6CIIGC+XjW9IYE8hwJeos+NdR/mtg4RXbBphmC9epALrnUc6MM7mUG8+Q
==.
Ê      Installing NuGet package NUnit3TestAdapter 4.3.1.
Ê      Generating MSBuild file D:\ccp_wrks\Poc\10-
PocNetFrameworkHelperLibrary\src\PocHelperLibrary\PocHelperLibraryTest\obj\PocHelperLibrar
yTest.csproj.nuget.g.props.
Ê      Writing assets file to disk. Path: D:\ccp_wrks\Poc\10-
PocNetFrameworkHelperLibrary\src\PocHelperLibrary\PocHelperLibraryTest\obj\project.ass
ets.json
Ê      Restored D:\ccp_wrks\Poc\10-
PocNetFrameworkHelperLibrary\src\PocHelperLibrary\PocHelperLibraryTest\PocHelperLibrar
yTest.csproj (in 376 ms).
Ê      Successfully installed 'NUnit3TestAdapter 4.3.1' to PocHelperLibraryTest
Ê      Executing nuget actions took 146 ms
Ê      Time Elapsed: 00:00:00.5394086

```

## ¥ NUnit Test SDK

## Install -Package Microsoft.NET.Test.Sdk

```
PM>
Restoring packages for D:\ccp_wrks\Poc\10-
PocNetFrameworkHelperLibrary\src\PocHelperLibrary\PocHelperLibraryTest\PocHelperLibraryTest.csproj...
GET https://api.nuget.org/v3-flatcontainer/microsoft.net.test.sdk/index.json
OK https://api.nuget.org/v3-flatcontainer/microsoft.net.test.sdk/index.json 135ms
GET https://api.nuget.org/v3-flatcontainer/microsoft.net.test.sdk/17.4.1/microsoft.net.test.sdk.17.4.1.nupkg
OK https://api.nuget.org/v3-flatcontainer/microsoft.net.test.sdk/17.4.1/microsoft.net.test.sdk.17.4.1.nupkg 7ms
GET https://api.nuget.org/v3-flatcontainer/microsoft.testplatform.testhost/index.json
GET https://api.nuget.org/v3-flatcontainer/microsoft.codecoverage/index.json
OK https://api.nuget.org/v3-flatcontainer/microsoft.testplatform.testhost/index.json 122ms
GET https://api.nuget.org/v3-flatcontainer/microsoft.testplatform.testhost/17.4.1/microsoft.testplatform.testhost.17.4.1.nupkg
OK https://api.nuget.org/v3-flatcontainer/microsoft.testplatform.testhost/17.4.1/microsoft.testplatform.testhost.17.4.1.nupkg 8ms
OK https://api.nuget.org/v3-flatcontainer/microsoft.codecoverage/index.json 146ms
GET https://api.nuget.org/v3-flatcontainer/microsoft.codecoverage/17.4.1/microsoft.codecoverage.17.4.1.nupkg
OK https://api.nuget.org/v3-flatcontainer/microsoft.codecoverage/17.4.1/microsoft.codecoverage.17.4.1.nupkg 8ms
GET https://api.nuget.org/v3-flatcontainer/microsoft.testplatform.objectmodel/index.json
GET https://api.nuget.org/v3-flatcontainer/newtonsoft.json/index.json
OK https://api.nuget.org/v3-flatcontainer/microsoft.testplatform.objectmodel/index.json 119ms
GET https://api.nuget.org/v3-flatcontainer/microsoft.testplatform.objectmodel/17.4.1/microsoft.testplatform.objectmodel.17.4.1.nupkg
OK https://api.nuget.org/v3-flatcontainer/microsoft.testplatform.objectmodel/17.4.1/microsoft.testplatform.objectmodel.17.4.1.nupkg 7ms
OK https://api.nuget.org/v3-flatcontainer/newtonsoft.json/index.json 141ms
GET https://api.nuget.org/v3-flatcontainer/newtonsoft.json/13.0.1/newtonsoft.json.13.0.1.nupkg
OK https://api.nuget.org/v3-flatcontainer/newtonsoft.json/13.0.1/newtonsoft.json.13.0.1.nupkg 8ms
GET https://api.nuget.org/v3-flatcontainer/nuget.frameworks/index.json
OK https://api.nuget.org/v3-flatcontainer/nuget.frameworks/index.json 122ms
GET https://api.nuget.org/v3-
```

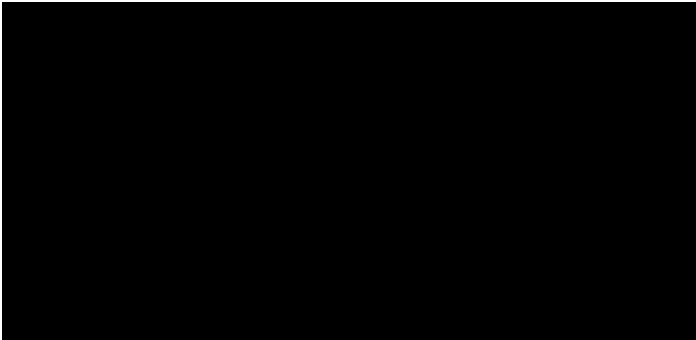
```

flatcontainer/nuget.frameworks/5.11.0/nuget.frameworks.5.11.0.nupkg
Ê      OK https://api.nuget.org/v3-
flatcontainer/nuget.frameworks/5.11.0/nuget.frameworks.5.11.0.nupkg 8ms
Ê      Installed Microsoft.NET.Test.Sdk 17.4.1 from
https://api.nuget.org/v3/index.json with content hash
kJ5/v2ad+VEg1fL8UH18nD71Eu+Fq6dM4RKBVqI V2MLSEK/AW4LUKqI k7m7G+BrxEDJVvPj xHam17nI dxV800w
==.
Ê      Installed NuGet.Frameworks 5.11.0 from https://api.nuget.org/v3/index.json
with content hash
eaiXkUj C4NPcquGWzAGMXj uxvLwc6XGKMptSy0GQeTOX70BUZ0buybJFZLA00FTdueLd3US23NBPTBb6i F3V1Q
==.
Ê      Installed System.Reflection.Metadata 1.6.0 from C:\Program Files
(x86)\Microsoft SDKs\NuGetPackages\ with content hash
COC1ai AJj CoA5GBF+QKL2uLqEBew4JsCkQmoHKbN3TI OZKa2fKLz5Cpi RQKDz0RsA0EGsVKq0D5bomsXq/4STQ
==.
Ê      Installed Newtonsoft.Json 13.0.1 from https://api.nuget.org/v3/index.json with
content hash
ppPFpBcvxdsfUonNcvl TKqLI 3bqxWbDCZI zDWHZj pdAHRfZe0Dw9HmA0+za13I dyrgJwpkDTDA9fHax0rt20A
==.
Ê      Installed Microsoft.TestPlatform.TestHost 17.4.1 from
https://api.nuget.org/v3/index.json with content hash
K7QXM4P4qrDKdPs/VSEKXR08QERu7daAK8vI l bhwENM3peXJwb9QgrAbtbYyyfVnX+F1m+1hntTH6aRX+h/f8g
==.
Ê      Installed Microsoft.TestPlatform.ObjectModel 17.4.1 from
https://api.nuget.org/v3/index.json with content hash
v2Cwoej usooZa/DZYt7UXo+CJ0vwAmqg6ZyFJel Bu+DCRDqpEt7WYhZ/AWi i OEkzANPPLU9+m148ai pYQkTuA
==.
Ê      Installed Microsoft.CodeCoverage 17.4.1 from
https://api.nuget.org/v3/index.json with content hash
T21Kxai Fawbrrj mOuXj xAStXaBm5P9H6Nnf8BUTBTvI pd8q57I rChVBCY2dnazmSu9/kuX4z5+kA0T78Dod7vA
==.
Ê      Installing NuGet package Microsoft.NET.Test.Sdk 17.4.1.
Ê      Generating MSBuild file D:\ccp_wrks\Poc\10-
PocNetFrameworkHel perLi brary\src\PocHel perLi brary\PocHel perLi braryTest\obj\PocHel perLi
braryTest.csproj.nuget.g.props.
Ê      Generating MSBuild file D:\ccp_wrks\Poc\10-
PocNetFrameworkHel perLi brary\src\PocHel perLi brary\PocHel perLi braryTest\obj\PocHel perLi
braryTest.csproj.nuget.g.targets.
Ê      Writing assets file to disk. Path: D:\ccp_wrks\Poc\10-
PocNetFrameworkHel perLi brary\src\PocHel perLi brary\PocHel perLi braryTest\obj\project.ass
ets.json
Ê      Restored D:\ccp_wrks\Poc\10-
PocNetFrameworkHel perLi brary\src\PocHel perLi brary\PocHel perLi braryTest\PocHel perLi brar
yTest.csproj (in 1.86 sec).
Ê      Successfully installed 'Microsoft.CodeCoverage 17.4.1' to PocHel perLi braryTest
Ê      Successfully installed 'Microsoft.NET.Test.Sdk 17.4.1' to PocHel perLi braryTest
Ê      Successfully installed 'Microsoft.TestPlatform.ObjectModel 17.4.1' to
PocHel perLi braryTest
Ê      Successfully installed 'Microsoft.TestPlatform.TestHost 17.4.1' to
PocHel perLi braryTest
Ê      Successfully installed 'Newtonsoft.Json 13.0.1' to PocHel perLi braryTest

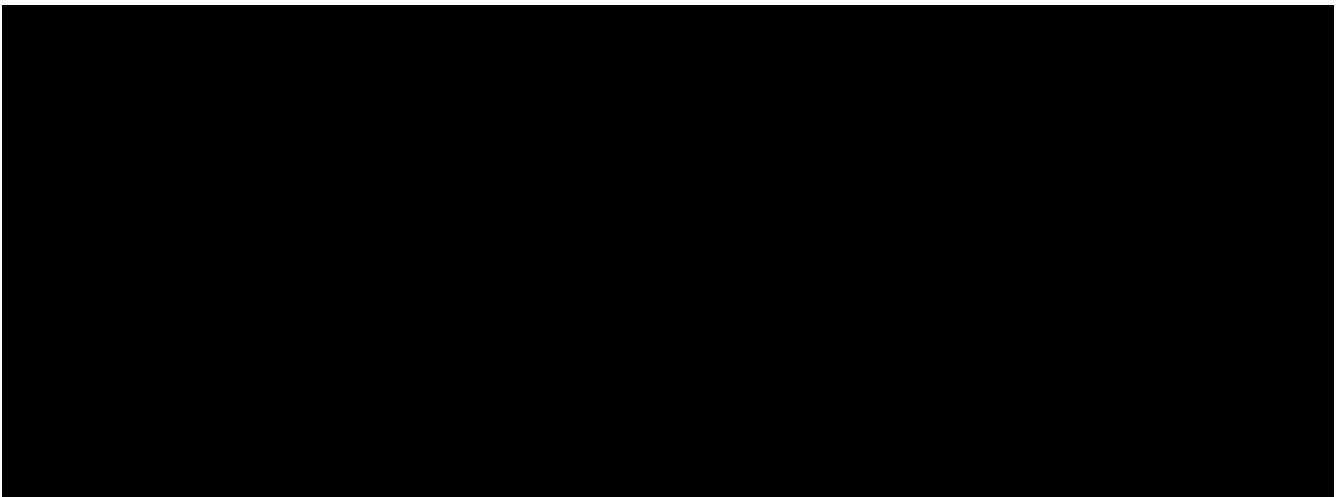
```

```
Ê      Successfully installed 'NuGet.Frameworks 5.11.0' to PocHelperLibraryTest
Ê      Successfully installed 'System.Reflection.Metadata 1.6.0' to
PocHelperLibraryTest
Ê      Executing nuget actions took 114 ms
Ê      Time Elapsed: 00:00:02.6533052
```

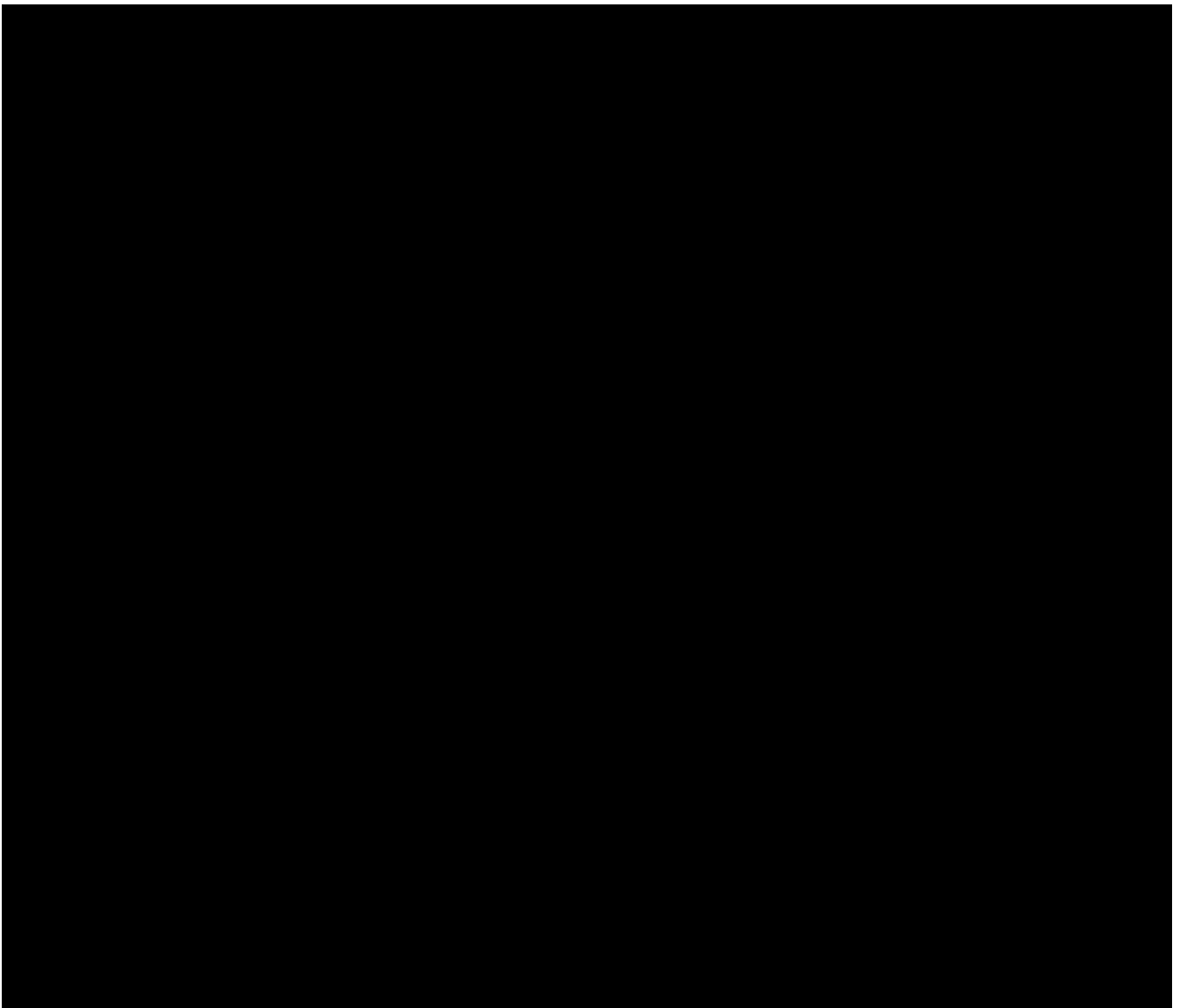
Sample image on references:



- ¥ Add reference from the library to test to the test library
- ¥ Add [TestFixture] attribute to class that contains tests
- ¥ Add [Test] attribute to the methods that define tests



- ¥ To test internal classes set them visible on the assembly
  - ! Add AssemblyInfo.cs file. On new core project the file is not generated by default.



¥ Add the following line to the file

```
[assembly: Internal sVi si bl eTo("LaSdeCSharpLi braryTest")]
```

